

A review of the Himalayan *Thorectes* (Coleoptera: Geotrupidae), with description of a new species from northern India

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A review of the Himalayan *Thorectes* (Coleoptera: Geotrupidae), with description of a new species from northern India. - *Thorectes shankara* sp. n. from West Himalayas is described and illustrated. A checklist of the Himalayan species of *Thorectes* is given, including detailed records. A key to these species is provided and their diagnostic characters are summarized. Metathoracic wings are strongly but not completely reduced in these species. The wing reduction in *Thorectes* is discussed.

Key-words: Coleoptera - Geotrupidae - Himalayas - India - wing size - taxonomy.

INTRODUCTION

In the framework of a worldwide generic revision of Geotrupinae, ZUNINO (1984) raised *Thorectes* Mulsant, 1842 from subgenus of *Geotrupes* Latreille, 1796 to genus, with 36 species included. The genus has discontinuous distribution, with 32 Mediterranean species, one (*T. banghaasi* Reitter, 1893) endemic in Gissar and Darvaz Mountains in Tajikistan (NIKOLAJEV 1987), and three from Nepal Himalayas (BARAUD 1974, KRIKKEN 1981). The Nepalese species are: *T. nepalensis* Baraud, 1974, *T. martensi* Krikken, 1981 and *T. stellosus* Krikken, 1981. Two subspecies are recognized in the latter species. New collections from the Indian part of the western Himalayas include an additional species of *Thorectes* which is described below.

***Thorectes shankara* sp. n.**

Holotype: ♂, India, Uttar Pradesh, Kedarnath 3300 m a.s.l. (14 kms north of Rambara), 26-29 July 1994, M. Snizek leg. *Paratypes*: 13 ♂♂ and 22 ♀♀, all from the type locality.

Holotype in Zoological Museum of Rome University (MZUR); 5 paratypes in the Carpaneto collection; 2 paratypes (1 ♂, 1 ♀) in the "Muséum d'histoire naturelle de Genève"; 2 paratypes (1 ♂, 1 ♀) in the "Forschungsinstitut Senckenberg, Frankfurt am Main"; remaining specimens in the Mignani collection.

Diagnosis: Allied to *T. nepalensis* (figs 1, 3, 15) but distinguished by the following characters: (1) third external tooth of protibia directed downwards (fig. 2); (2) 7 teeth, instead of 6, along outer margin of protibia (fig. 2); (3) 8-9 denticles, instead of 7, along ventral face of protibia (fig. 2); (4) pronotum more strongly convex; (5) pronotal surface shining, elytral surface sericeous; (6) elytral striae partially effaced but all moderately distinct; (7) mesosternal apophysis pointed anteriorly (on lateral view); (8) disc of metasternum and of abdominal sternites glabrous and almost impunctate; (9) apex of parameres wider and more rounded, slightly turned downwards (fig. 4).

Description of the holotype: Male, length 17.5 mm, greatest width 8.7 mm. Entirely black. Moderately shining but elytra opaque with sericeous aspect. Antennal club brownish black.

Clypeus (length 3.7 mm) widely U-shaped. Clypeal surface densely and roughly punctate. Clypeal margin slightly raised. Disc with obsolete central elevation. Eye normally shaped, eye-canthus broadly rounded, with anterolateral angle subdistinct. Clypeo-frontal sulcus V-shaped, fronto-lateral ridge moderately pronounced. Labrum with anterior margin feebly emarginate and sides rounded. Left mandible with shallow apical external emargination. Right mandible with protruding lobe near apical-external emargination.

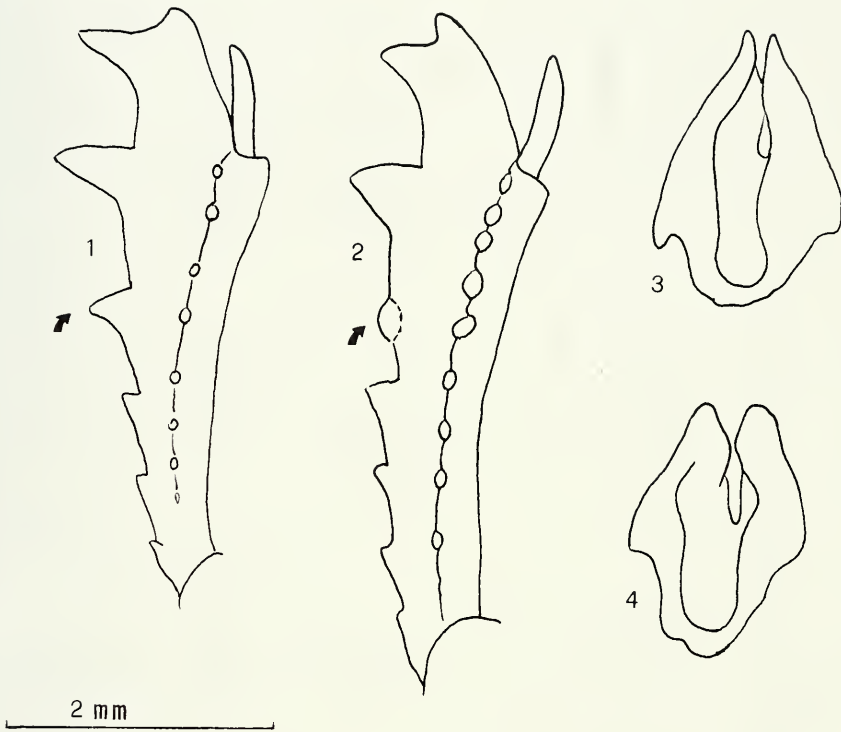
Pronotum (length 5 mm) strongly convex, with maximum width (8.7 mm) at posterior half, entirely marginate, except for posterior edge on both sides of antescutellar section of base. Pronotal contours with anterior angle ca. 100°, posterior angle rounded. Pronotal punctation very fine, formed by small and minute punctures (as in *T. nepalensis*), and widely scattered all over surface. Scutellum broadly triangular (length 1 mm). Elytra convex (maximum length 8.7 mm; maximum width 8.7), humeral angle rounded, with umbone distinct. Elytral striae irregular and moderately distinct. Surface opaque with sericeous aspect due to microreticulation. Wings strongly reduced (micropterous): wing length 2.6 mm. WL/EL (wing length/elytral length) 0.3. Mesosternal apophysis pointed anteriorly (on lateral view); mesosternal cavity deep. Metasternum with very shallowly impressed midline. Disc of metasternum and of abdominal sternites glabrous and almost impunctate.

Protibia with 7 teeth along outer margin, apical tooth bifid; third external tooth directed downwards; inferior longitudinal crest with 9 denticles (fig. 2). Metafemur with irregular series of 6-7 denticles, some notched, decreasing in size towards apex (fig. 5).

Apex of parameres wide and rounded, slightly turned downwards (in *T. nepalensis*, parameres have apex narrower, more pointed, and distinctly directed upwards) (figs 3-4).

Paratype variability: Male length: 15-18.4 mm; male width: 7.7-9.1 mm. Female length: 12.5-18.6 mm; female width: 6.1-9.5 mm. In males, the shape and the number of the denticles on the posterior margin of the metafemur are highly variable (figs 5-12); a certain degree of variability is also observed in the inferior denticulation of protibia.

Sexually-dimorphic characters are as those usual in other Himalayan *Thorectes* species. Females differ by: (1) apical tooth of protibia simple (not bifid); (2) protibia



FIGS 1-4

Thorectes nepalensis (holotype): 1, underside of protibia; 3, ventral view of parameres. *Thorectes shankara* sp. n. (holotype): 2, underside of protibia; 4, ventral view of parameres. The arrows in figs 1-2 indicate the third external tooth of tibia.

without inferior crest of denticles; (3) metafemur without denticles; (4) pronotum less convex and narrower, with a slightly denser punctation.

Ecological notes: According to the collector, Miroslav Snizek, the specimens were captured in pitfall traps (with fish as bait), during several rainy days, on the western slope of a mountain near to Kedarnath. The slope was covered by a mixed forest, slightly damaged by cutting.

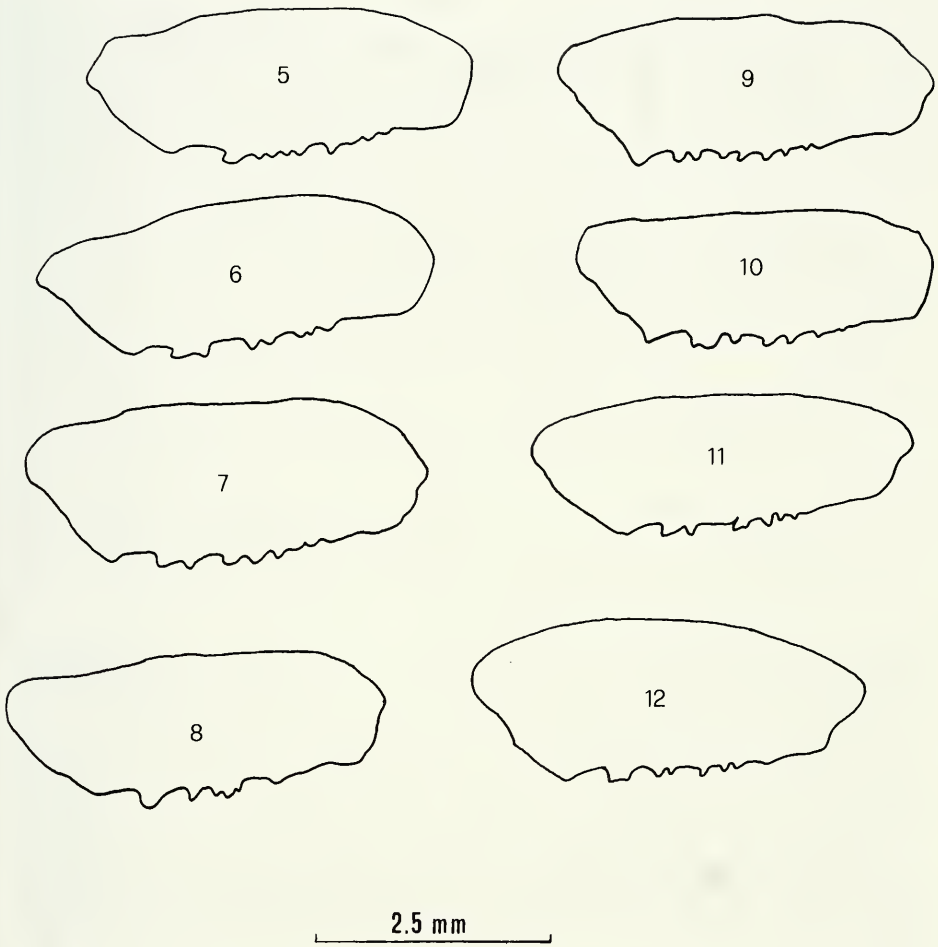
Etymology: This species is named to honour the Indian philosopher Shankara (dead at Kedarnath about 750 AD).

CHECKLIST OF THE HIMALAYAN THORECTES

A checklist of the Himalayan species and subspecies of the genus *Thorectes* is here given together with the material examined and distribution, including the altitudinal range. The main diagnostic characters are compared in Table 1.

TABLE 1 - Diagnostic characters of the Himalayan species and subspecies of *Thorectes*.

Characters	<i>T. martensi</i>	<i>T. shankara</i>	<i>T. nepalensis</i>	<i>T. stellosus</i> s. str.	<i>T. s. annapurnicus</i>
Pronotal punctures	dense, well impressed	sparse, fine	sparse, fine	large, well impressed	large, feebly impressed
Pronotal surface (male)	shiny, anteriorly flat	shiny, strongly convex	shiny	opaque, wrinkled	opaque, wrinkled
External teeth of male protibia	7	7	6	7	5 or 6
Ventral denticles of male protibia	5 or 6	8 or 9	7	8 or 9	8 or 9
Extra ventral tooth of male protibia	absent	absent	absent	present	present
Elytral surface	shiny	sericeous	shiny	opaque, wrinkled	opaque, wrinkled
Elytral striae	distinct	partially effaced	effaced	effaced	partially effaced
Mesosternal apophysis	pro-w-shaped	pointed	pro-w-shaped	pointed	pointed
Metasternal disc	strongly punctate, glabrous	impunctate, glabrous	punctate, setose	punctate, setose	punctate, setose
Disc of abdominal sternites	punctate, glabrous	impunctate, glabrous	punctate, setose	punctate, setose	punctate, setose
Male metafemur	unidentate	multidentate	multidentate	multidentate	multidentate



FIGS 5-12

Variation of denticles on posterior margin of metafemur in males of *Thorectes shankara* sp. n. (12, holotype).

T. martensi Krikken, 1981

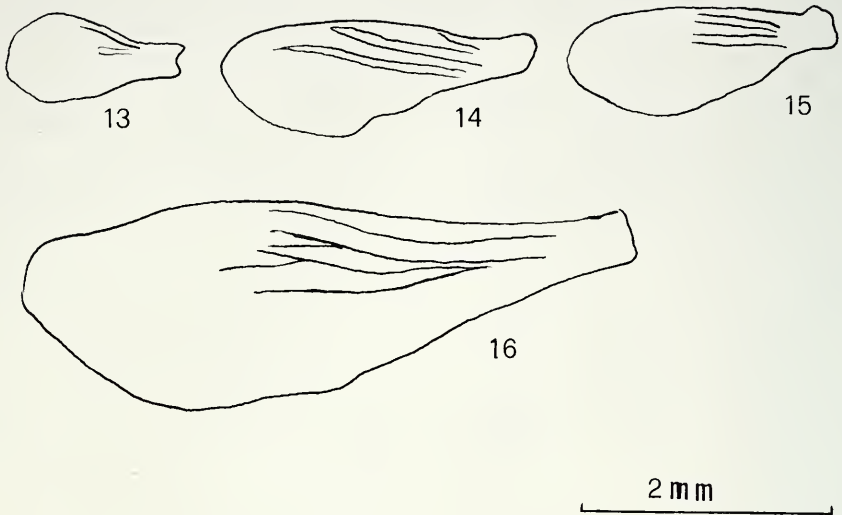
Material examined: Paratype ♂, Nepal, S-Dhaulagiri, Dhorpatan, 3000-3200 m, 7-25 May 1973, Expedition Jochen Martens (Forschungsinstitut Senckenberg, Frankfurt am Main, Germany).

Distribution: Nepal, S-Dhaulagiri, 3000-3600 m a.s.l.

T. shankara sp. n.

Material examined: See description, type material.

Distribution: India, Uttar Pradesh, 3300 m a.s.l.



Figs 13-16

Wing size in Himalayan species of the genus *Thorectes*: 13, *T. martensi*; 14, *T. shankara*; 15, *T. nepalensis*; 16, *T. stellosus*.

T. nepalensis Baraud, 1974

Material examined: Holotype ♂, Nepal, Katmandu, Miss. USHQ, 1953 (Muséum d'histoire naturelle de Genève). 1 ♂, Nepal, Karnali zone, Churchi Lagna, N Jumla, 3400 m, 26 June-2 July 1995, Ahrens & Pommeranz leg. (G. Carpaneto collection).

Distribution: W and C Nepal, 2300-3400 m a.s.l.

T. stellosus stellosus Krikken, 1981

Material examined: Paratype ♂, Nepal, S-Dhaulagiri, Bobang, S of Dhorpatan, 2500 m, April 1970, Expedition Jochen Martens; Paratype ♀, (idem) (both in Forschungsinstitut Senckenberg, Frankfurt am Main, Germany).

Distribution: Nepal, S-Dhaulagiri (only known from type locality).

T. stellosus annapurnicus Krikken, 1981

Material examined: Paratype ♂, Nepal, S-Annapurna, Gorapani Pass, 2750-2900 m, 24-28 July 1970, Expedition Jochen Martens; Paratype ♀ (idem) (both in Forschungsinstitut Senckenberg, Frankfurt am Main, Germany).

Distribution: Nepal, S-Annapurna (only known from type locality).

KEY TO HIMALAYAN SPECIES AND SUBSPECIES OF THE GENUS *THORECTES*

1. Elytra without distinct striae. Inferior crest of male metafemora multi-dentate (Figs 5-12). Pronotum normally convex 2
- Elytra with moderately distinct striae. Inferior crest of male metafemora at most with a single small tooth. Pronotum flattened anteriorly *martensi*
2. Upper surface smooth. Pronotum shiny, with fine punctures. Male protibiae with multidentate inferior crest (Figs 1-2) 3
- Upper surface wrinkled. Pronotum opaque, with large punctures. Male protibiae with multidentate inferior crest and one non-aligned additional tooth 4
3. Third external tooth of male protibiae directed downwards (Fig. 2); elytral surface sericeous; disc of metasternum and of abdominal sternites glabrous and almost impunctate *shankara*
- Third external tooth of male protibiae directed outwards (Fig. 1); elytral surface shining like pronotum; disc of metasternum and abdominal sternites punctate and setose *nepalensis*
4. Dorsum coarsely wrinkled, pronotum with well impressed, star-like punctures; western form (Dhaulagiri area) *stellosus stellosus*
- Dorsum finely wrinkled, pronotum with feebly impressed punctures; eastern form (Annapurna area) *stellosus annapurnicus*

DISCUSSION

According to ZUNINO (1984) two lineages occur within the genus *Thorectes*: the first including most of the Mediterranean/south-European species and *T. banghaasi* from Tajikistan; the second one including the Himalayan species and two western Mediterranean species (*T. geminatus* Gené, 1839 and *T. punctatissimus* Chevrolat, 1840). Subsequently, LOPEZ-COLON (1989) splitted the genus *Thorectes* into four subgenera: *Thorectes* Mulsant, 1942; *Zuninoe* Lopez-Colon, 1989; *Jekelius* Lopez-Colon, 1989; *Silphotrupes* Jekel, 1866. The last was originally conceived by JEKEL (1866) to group species having the apical tooth of male protibia simple and clypeus semielliptic (*T. punctatissimus* and *T. escorialensis* Jekel, 1866), but LOPEZ-COLON placed here species which ZUNINO (1984) considered related to *T. punctatissimus*, i.e. *T. geminatus* and the Himalayan species. However, the latter ones were not examined by LOPEZ-COLON (1989), and therefore his conclusions were based on descriptions only. Thus, his subgeneric arrangement needs to be confirmed after a more comprehensive revision.

The new species is closely related to *T. nepalensis*, as suggested by the shape of male genitalia. The presence of teeth on posterior margin of male metafemora is a character shared by some geotrupid genera which are very distant among them as well as belonging to different tribes (e.g., *Thorectes* among Geotrupini, *Chromogeotrupes* Bovo & Zunino, 1983, and *Phelotrupes* Jekel, 1866, among Chromogeotrupini). Within the genus *Thorectes*, this character also occurs in *T. geminatus*, *T. valencianus*, and *T. distinctus*; but only 5 species (*T. valencianus*, *T. geminatus*, *T. nepalensis*, *T. stellosus* and *T. shankara*) show a true denticulation (not a single tooth), i.e. a series of small teeth along the posterior margin of metafemur.

The genus *Thorectes* was so far considered to comprise wingless species (BOUCOMONT 1905; BARAUD 1966a, 1966b). In order to check this character state, we dissected several species, including all members of the subgenus *Silphotrupes*, and the type species of other subgenera. Actually, all members of *Thorectes* show wing reduction and sometimes complete absence of wings. We have calculated the ratio WL/EL (wing length/elytral length) to evaluate the meiopterism degree according to the classification used by BIONDI (1993) for Chrysomelidae Alticinae. The WL/EL may vary from micropterous to subapterous condition: only *T. geminatus* resulted to be apterous; *T. shankara* shows a 0.3 value of the ratio and is considered micropterous; all other species examined have extremely reduced hind wing (WL/EL < 0.3) and so belong to the subapterous group. Wings of Himalayan species are shown in figs. 13-16.

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